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P-034

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Application of : **WACHTFOGEL et al.**
:
Serial No.: 09/515,118 : Group Art Unit: 2611
:
Filed : 24 February 2000 : Examiner: Hai V. TRAN
:
For : **ADVANCED TELEVISION SYSTEM**

Honorable Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

DECLARATION UNDER 37 CFR 1.131

Sir:

We, the undersigned, Reuven WACHTFOGEL, David RICHARDSON, Shlomo KIPNIS, Jonathan MAISSEL, Yossef TSURIA, and Yonatan SILVER, hereby declare as follows:

1) We are the Applicants in the patent application identified above, and are co-inventors of the subject matter described and claimed in claims 70 - 73, 75, 76, 107, 109, 111 - 117, 119, 121 - 127, 129, and 131 therein.

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2) Prior to 15 June 1998, we conceived our invention, as described and claimed in the above-mentioned claims in the subject application, in Israel, a WTO country. Conception of the invention is evidenced by a draft of the present patent application. The draft was prepared by Doron Handelman, who is an Israel Patent Attorney who provides services under contract to NDS Technologies Israel Ltd., a research and development affiliate of the Assignee of the subject application. Doron Handelman was given the task of preparing an Israel patent application from which the above-identified application claims priority (hereinafter "the Israel application"), under the supervision of David Zviel, who is an Israel Patent Attorney and a US Patent Agent, and who was on the dates referred to in this declaration employed by and is now employed by NDS Technologies Israel Ltd. The typewritten draft was prepared and submitted to us prior to 15 June 1998, on the basis of information that we supplied to Mr. Handelman and to Mr. Zviel. Appendix A is a copy of this draft, that also includes handwritten annotations by one of us. The date which is deleted from each of the pages of Appendix A is prior to 15 June 1998.

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3) Conception of the invention covered by claims 70 - 73, 75, 76, 107, 109, 111 - 117, 119, 121 - 127, 129, and 131 in the present patent application is evidenced as follows:

Claims	Examples of Support in Appendix A
70. A broadcast system comprising:	1 st line of 3d para. on p. 3
a headend for broadcasting program material with commercials;	2d para. on p. 5
and a multiplicity of receiver-decoders at user locations,	1 st two lines of 2d para. on p. 5; 1 st line of 4 th para. on p. 5; IRD 40 of Fig. 1
each receiving said program material being broadcast and including a commercial unit for dealing with said commercials based at least partially on past viewing thereof,	the 1 st full paragraph on page 13; the paragraph bridging page 15 and page 16; the 1 st , 2 nd and 3 rd full paragraphs on page 16 (from the 7 th printed line to the 23 rd printed line); the 1 st full paragraph on page 17; the 3 rd , 4 th and 5 th full paragraphs on page 17; the 1st full paragraph of page 20 (from the 6 th printed line to the 11 th printed line on page 20); Fig. 1, and specifically the commercial manager 150 of Fig. 1; and Fig. 3B.
wherein each said receiver-decoder deals with said commercial by determining conditions pursuant to which they are viewed by a user.	Lines 2-23 on page 16; the 3 rd , 4 th and 5 th full paragraphs on page 17; the 1st full paragraph of page 20 (from the 6 th printed line to the 11 th printed line on page 20)

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71. A receiver-decoder for use with a broadcast system having a headend for broadcasting program material with commercials and a multiplicity of receiver-decoders at user locations, said receiver-decoder comprising:	1 st line of 3d para. on p. 3; 2d para. on p. 5; 1 st two lines of 2d para. on p. 5; 1 st line of 4 th para. on p. 5; IRD 40 of Fig. 1
a receiver for receiving said program material being broadcast;	3d para. on p. 5
and a commercial unit for dealing with said commercials based at least partially on past viewing thereof,	the 1 st full paragraph on page 13; the paragraph bridging page 15 and page 16; the 1 st , 2 nd and 3 rd full paragraphs on page 16 (from the 7 th printed line to the 23 rd printed line); the 1 st full paragraph on page 17; the 3 rd , 4 th and 5 th full paragraphs on page 17; the 1st full paragraph of page 20 (from the 6 th printed line to the 11 th printed line on page 20); Fig. 1, and specifically the commercial manager 150 of Fig. 1; and Fig. 3B.
wherein said receiver-decoder deals with said commercials by determining conditions pursuant to which they are viewed by a user.	Lines 2-23 on page 16; the 3 rd , 4 th and 5 th full paragraphs on page 17; the 1st full paragraph of page 20 (from the 6 th printed line to the 11 th printed line on page 20)

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<p>72. A receiver-decoder according to claim 71 and wherein said receiver-decoder deals with said commercials based at least partially on a history of viewing said commercials via said receiver-decoder.</p>	<p>the paragraph bridging page 15 and page 16; the 1st, 2nd and 3rd full paragraphs on page 16 (from the 7th printed line to the 23rd printed line); in particular, 5th para. on p. 17 and 1st full para. on p. 20.</p>
<p>73. A receiver-decoder according to claim 71 and wherein said receiver-decoder deals with said commercials based at least partially on a history of viewing said commercials by multiple users.</p>	<p>the paragraph bridging page 15 and page 16; the 1st, 2nd and 3rd full paragraphs on page 16 (from the 7th printed line to the 23rd printed line), and specifically line 11 on p. 16; para. bridging pp. 16-17</p>
<p>75. A receiver-decoder according to claim 71 and wherein said receiver decoder deals with said commercials by determining conditions pursuant to which viewing of said commercials is obviated by user action.</p>	<p>the paragraph bridging page 15 and page 16; the 1st, 2nd and 3rd full paragraphs on page 16 (from the 7th printed line to the 23rd printed line); in particular, 3d full para. on p. 16 and 5th full para. on p. 17</p>
<p>76. A receiver-decoder according to claim 71 and wherein said receiver decoder deals with said commercials by determining conditions pursuant to which their viewing may be obviated independently of user action.</p>	<p>the 1st, 2nd and 3rd full paragraphs on page 16 (from the 7th printed line to the 23rd printed line); in particular, line 14 on p. 16 and 3d full para. on p. 17.</p>

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107. A broadcast system according to claim 70 and wherein, for at least one of said commercials, said receiver-decoder deals with said one commercial by preventing the user from skipping said one commercial.	in particular, lines 2-3 on p. 16; see also the 1 st , 2 nd and 3 rd full paragraphs on page 16 (from the 7 th printed line to the 23 rd printed line);
109. A receiver-decoder according to claim 71 and wherein, for at least one of said commercials, said receiver-decoder deals with said one commercial by preventing the user from skipping said one commercial.	Supported by same support as claim 107
111. A broadcast method comprising: broadcasting program material with commercials;	1 st line of 3d para. on p. 3; 2d para. on p. 5
and receiving, at a multiplicity of user locations, said program material being broadcast and dealing with said commercials based at least partially on past viewing thereof,	1 st two lines of 2d para. on p. 5; the 1 st full paragraph on page 13; the paragraph bridging page 15 and page 16; the 1 st , 2 nd and 3 rd full paragraphs on page 16 (from the 7 th printed line to the 23 rd printed line); the 1 st full paragraph on page 17; the 3 rd , 4 th and 5 th full paragraphs on page 17; the 1st full paragraph of page 20 (from the 6 th printed line to the 11 th printed line on page 20); Fig. 1, and specifically the commercial manager 150 of Fig. 1; and Fig. 3B.

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wherein said dealing with said commercials comprises determining conditions pursuant to which they are viewed by a user.	Lines 2-23 on page 16; the 3 rd , 4 th and 5 th full paragraphs on page 17; the 1st full paragraph of page 20 (from the 6 th printed line to the 11 th printed line on page 20)
112. A method for use with a broadcast system having a headend for broadcasting program material with commercials and a multiplicity of user locations, said method comprising:	1 st line of 3d para. on p. 3; 2d para. on p. 5
receiving said program material being broadcast;	3d para. on p. 5
dealing with said commercials based at least partially on past viewing thereof,	the 1 st full paragraph on page 13; the paragraph bridging page 15 and page 16; the 1 st , 2 nd and 3 rd full paragraphs on page 16 (from the 7 th printed line to the 23 rd printed line); the 1 st full paragraph on page 17; the 3 rd , 4 th and 5 th full paragraphs on page 17; the 1st full paragraph of page 20 (from the 6 th printed line to the 11 th printed line on page 20); Fig. 1, and specifically the commercial manager 150 of Fig. 1; and Fig. 3B.
wherein said dealing with said commercials comprises determining conditions pursuant to which they are viewed by a user.	Lines 2-23 on page 16; the 3 rd , 4 th and 5 th full paragraphs on page 17; the 1st full paragraph of page 20 (from the 6 th printed line to the 11 th printed line on page 20)

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113. A method according to claim 112 and wherein said dealing with said commercials comprises dealing with said commercials based at least partially on a history of viewing of said commercials at said user location.	Supported by the same support as claim 72.
114. A method according to claim 112 and wherein said dealing with said commercials comprises dealing with said commercials based at least partially on a history of viewing of said commercials by multiple users.	Supported by the same support as claim 73.
115. A method according to claim 112 and wherein said dealing with said commercials comprises dealing with said commercials by determining conditions pursuant to which viewing of said commercials is obviated by user action.	Supported by the same support as claim 75.
116. A method according to claim 112 and wherein said dealing with said commercials comprises determining conditions pursuant to which their viewing may be obviated independently of user action.	Supported by the same support as claim 76.

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117. A broadcast method according to claim 111 and wherein, for at least one of said commercials, said dealing with said commercials comprises dealing with said one commercial by preventing the user from skipping said one commercial.	Supported by the same support as claim 107.
119. A broadcast method according to claim 112 and wherein, for at least one of said commercials, said dealing with said commercials comprises dealing with said one commercial by preventing the user from skipping said one commercial.	Supported by the same support as claim 107.
121. A broadcast system comprising: means for broadcasting program material with commercials;	1st line of 3d para. on p. 3; 3d para. on p. 5.
and means for receiving, at a multiplicity of user locations, said program material being broadcast and for dealing with said commercials based at least partially on past viewing thereof,	1 st two lines of 2d para. on p. 5; the 1 st full paragraph on page 13; the paragraph bridging page 15 and page 16; the 1 st , 2 nd and 3 rd full paragraphs on page 16 (from the 7 th printed line to the 23 rd printed line); the 1 st full paragraph on page 17; the 3 rd , 4 th and 5 th full paragraphs on page 17; the 1st full paragraph of page 20 (from the 6 th printed line to the 11 th printed line on page 20); Fig. 1, and specifically the commercial manager 150 of Fig. 1; and Fig. 3B.

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wherein said dealing with said commercials comprises determining conditions pursuant to which they are viewed by a user.	Lines 2-23 on page 16; the 3 rd , 4 th and 5 th full paragraphs on page 17; the 1st full paragraph of page 20 (from the 6 th printed line to the 11 th printed line on page 20)
122. A receiver-decoder for use with a broadcast system having a headend for broadcasting program material with commercials and a multiplicity of user locations, said receiver-decoder comprising:	1 st line of 3d para. on p. 3; 2d para. on p. 5; 1 st two lines of 2d para. on p. 5; 1 st line of 4 th para. on p. 5; IRD 40 of Fig. 1
means for receiving said program material being broadcast;	3d para. on p. 5
means for dealing with said commercials based at least partially on past viewing thereof,	the 1 st full paragraph on page 13; the paragraph bridging page 15 and page 16; the 1 st , 2 nd and 3 rd full paragraphs on page 16 (from the 7 th printed line to the 23 rd printed line); the 1 st full paragraph on page 17; the 3 rd , 4 th and 5 th full paragraphs on page 17; the 1st full paragraph of page 20 (from the 6 th printed line to the 11 th printed line on page 20); Fig. 1, and specifically the commercial manager 150 of Fig. 1; and Fig. 3B.
wherein said dealing with said commercials comprises determining conditions pursuant to which they are viewed by a user.	Lines 2-23 on page 16; the 3 rd , 4 th and 5 th full paragraphs on page 17; the 1st full paragraph of page 20 (from the 6 th printed line to the 11 th printed line on page 20)

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123. A receiver-decoder according to claim 122 and wherein said dealing with said commercials comprises dealing with said commercials based at least partially on a history of viewing said commercials at said user location.	Supported by the same support as claim 72.
124. A receiver-decoder according to claim 122 and wherein said dealing with said commercials comprises dealing with said commercials based at least partially on a history of viewing of said commercials by multiple users.	Supported by the same support as claim 73.
125. A receiver-decoder according to claim 122 and wherein said dealing with said commercials comprises dealing with said commercials by determining conditions pursuant to which viewing of said commercials is obviated by user action.	Supported by the same support as claim 75.
126. A receiver-decoder according to claim 122 and wherein said dealing with said commercials comprises determining conditions pursuant to which their viewing may be obviated independently of user action.	Supported by the same support as claim 76.

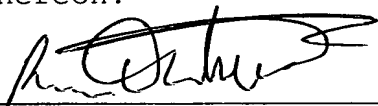
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127. A broadcast system according to claim 121 and wherein, for at least one of said commercials, said receiver-decoder deals with said one commercial by preventing the user from skipping said one commercial.	Supported by the same support as claim 107.
129. A receiver-decoder according to claim 122 and wherein, for at least one of said commercials, said receiver-decoder deals with said one commercial by preventing the user from skipping said one commercial.	Supported by the same support as claim 107.
131. A method for use with a broadcast system having a headend for broadcasting program material with commercials and a multiplicity of user locations, said method comprising:	1 st line of 3d para. on p. 3; 2d para. on p. 5
receiving said program material being broadcast;	3d para. on p. 5
dealing with said commercials,	the 1 st full paragraph on page 13; the paragraph bridging page 15 and page 16; the 1 st , 2 nd and 3 rd full paragraphs on page 16 (from the 7 th printed line to the 23 rd printed line); and the 1 st full paragraph on page 17.

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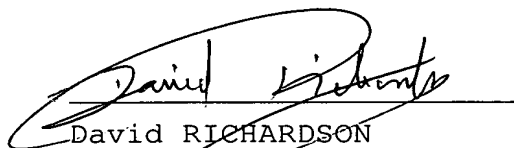
wherein, for at least one of said commercials, said dealing with said commercials comprises dealing with said one commercial by preventing a user from skipping said one commercial.	Lines 2-3 on p. 16
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We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or of any patent issued thereon.



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FIELD OF THE INVENTION

The present invention relates to digital television recording systems.

BACKGROUND OF THE INVENTION

Today, television programs are recorded on low capacity magnetic tape storage devices using video cassette recorders (VCRs). Typically, conventional video cassettes store only three or four hours of good quality movies. Thus, in order to record many programming hours, a user must use several video cassettes.

When the user wants to see a portion of a movie, the user must first determine in which cassette the movie is recorded. Although the user may write on each cassette titles of movies recorded therein, most users do not keep track of the movies recorded on their video cassettes. This makes searching of movies in video cassettes difficult.

Even after the user determines which video cassette includes the required movie, the user must rewind the cassette or move forward to find the portion of the movie. Such operations typically wear several electro-mechanical parts of a VCR thereby resulting in a need for frequent repairs in video laboratories.

Some VCRs also provide an editing function which enables the user to edit a recorded movie. However, editing with a VCR is difficult and requires frequent rewinding or moving forward of video cassettes which, as mentioned above, wears several electro-mechanical parts of the VCR.

Thus, it is appreciated that a recording and retrieval system which enables easy access to selected portions of stored movies and simple editing of movies will be highly desired.

In a publication titled "Double Agent - Presentation and Filtering Agents for a Digital Television Recording system" by Meuleman et al. of Philips Research, Eindhoven, The Netherlands, dated 18-23 April 1998, there is described a double agent which explores scenarios for automated selection of television

programs and their presentation via anthropomorphic interfaces. The double agent operates on data recorded by an experimental digital VCR.

In a publication titled "SMASH - a concept for advanced use of storage at home" by Persoon of Philips Research, Eindhoven, The Netherlands, dated 03/05/98, the concept of SMASH (Storage for Multimedia Applications and Systems) is described. The main goal of the project is to explore the future possibilities offered on the one hand by the massive amount of new digital services that enter the consumers home and on the other hand the impressive progress of storage technologies that are suitable for home use.

In a publication titled "Mediators - Guides through online TV services" by Kohar et al. of Philips Research, Eindhoven, The Netherlands, dated 03/05/98, there are described anthropomorphic guides who aid users in selection and navigation to content in interactive television services.

The disclosures of all references mentioned above and throughout the present specification are hereby incorporated herein by reference.

Additionally, flexible programming tools may be adapted which are tailored to specific needs of television viewers.

There is thus provided in accordance with a preferred embodiment of the present invention [TO BE COMPLETED BASED ON THE FINAL VERSION OF THE CLAIMS]

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be understood and appreciated more fully from the following detailed description, taken in conjunction with the drawings in which:

Fig. 1 is a simplified block diagram illustration of digital television recording apparatus constructed and operative in accordance with a preferred embodiment of the present invention;

Fig. 2 is a simplified flow chart illustration of a preferred method of operation of the apparatus of Fig. 1; and

Figs. 3A and 3B together constitute a simplified flow chart illustration of a preferred method of manipulation of television programs recorded in the apparatus of Fig. 1.

SUMMARY OF THE INVENTION

The present invention seeks to provide digital television recording apparatus having powerful yet simple user interface which enables manipulation of information recorded by the digital television recording apparatus.

In the present invention, television programs are recorded in a high capacity memory. The television programs include various types of television material, such as programs, commercials, video clips, program guides, data, multimedia information and teletex. The high capacity memory may include a high capacity hard disk and a high capacity external memory.

A user may either watch broadcast television or programs retrieved from the high capacity memory. When viewing a program retrieved from the memory, the user has a variety of possibilities to manipulate the program, such as editing, marking and combining highlights in the program, tagging the program for retrieval under predetermined conditions, changing parental control criteria and using special features, such as picture-in-picture (PIP). The user also has additional interactive features.

The user may switch from broadcast television to the stored program in a simple way. Additionally, one of the features provided by the digital television recording apparatus is program freezing in which the program is frozen when the user is required to stop watching television, and then automatically recorded in the memory from the moment of freeze. When the user is able to watch television again, the program is retrieved from the memory and the user may resume watching the program in a delayed mode from the moment of freeze.

Storage of television programs makes it possible to treat the programs as computer software programs and thus many advantages arise. Additionally, flexible programming tools may be adapted which are tailored to specific needs of television viewers.

There is thus provided in accordance with a preferred embodiment of the present invention [TO BE COMPLETED BASED ON THE FINAL VERSION OF THE CLAIMS]

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Reference is now made to Fig. 1 which is a simplified block diagram illustration of digital television recording apparatus 10 constructed and operative in accordance with a preferred embodiment of the present invention.

Preferably, the apparatus 10 receives television programs from a headend 15 via a satellite 20. Alternatively, the apparatus 10 may receive television programs from a cable headend (not shown). Typically, the television programs include various types of television material, such as programs, commercials, video clips, program guides, data, multimedia information and teletex.

The television programs are preferably received at an antenna 25 and provided, via a coaxial cable 30 and a connector 35, or any other appropriate conventional coupling means, to the apparatus 10. At the apparatus 10, the television programs are preferably received and decoded in an integrated receiver and decoder (IRD) 40 which preferably includes a conventional IRD.

Preferably, the television programs received and decoded at the IRD 40 may be provided, under control of a processor 45, either directly to a television 50 or to a high capacity memory 55 preferably via a data bus 60. The high capacity memory 55 may preferably include a conventional high capacity hard disk as used in conventional personal computers. It is appreciated that today a conventional computer typically includes a hard disk having a capacity of 2 - 4 Gigabyte, and hard disks with capacities of 10 Gigabyte are considered today as state-of-the-art.

Typically, a good quality movie of two hours requires a storage capacity of 4 Gigabyte. Thus, the high capacity memory 55 may typically store one or two full length movies, or several typical television shows, each having a length of 30 - 45 minutes.

Preferably, some television programs may be also stored in an external removable memory 65, such as a magnetic tape, a CD-ROM (Compact-Disk Read-Only-Memory) and a removable disk, under control of the processor 45. The external removable memory 65 is preferably accessible via a removable memory reader and writer 70 which is operatively associated with the

'home'
videos?

other
devices
with
appropriate
connection
eg. stereo
etc.

is this
background
or are
you saying
it will
have only
10 Giga?

DVD

data bus 60. It is appreciated that the external removable memory 65 may be used to extend storage capacity of the apparatus 10 so that a plurality of movies may be stored in both the memories 55 and 65.

mention a robot may be used to

Preferably, the high capacity memory 55 and the external removable memory 65 may additionally store video and audio information provided by at least one of the following sources: an external video source 75; a telephone network 80; and a local area network (LAN) 85. It is appreciated that the video and audio information provided by the telephone network 80 and the LAN 85 may originate from external sources, such as the World Wide Web (WWW) (not shown), and may be routed to the telephone network 80 and the LAN 85 via networks, such as the Internet (not shown), and a wide area network (WAN) (not shown).

change recording media

(eg. tapes or read/write

cd roms/dvd)

It is appreciated that at least one of the memory 55 and the memory 65 may be divided into two parts: a broadcaster part which may include, for example, commercials which the broadcaster is interested that a user will view; and a user part in which information generated by the user may be stored. It is appreciated that information may be transferred from the user part to the broadcaster part and vice versa. Preferably, television programs are first stored in the broadcaster part and transferred to the user part when the user retrieves the programs or edits the programs.

*part?
word
missing?*

do we want to get into tape + disk

Preferably, the apparatus 10 communicates with the telephone network 80 via a modem 90 and with the LAN 85 via a LAN interface 95. The video source 75 is typically operatively associated with the processor 45 via the data bus 60. Alternatively, the video source may be associated with an image processor (not shown) which may be operatively associated with the data bus 60.

*efficiency
measures*

*eg.
first minute
is always
on HDisk
- gets the
via the tape
to get to
the right
place*

It is appreciated that the apparatus 10 may also communicate with the headend 15 via one of the telephone network 80 and the LAN 85. Alternatively, the apparatus 10 may communicate with the headend 15 by employing a radio frequency (RF) transmitter 100 for transmitting uplink information via the connector 35, the coaxial cable 30, the antenna 25 and the satellite 20. Preferably, the transmitter 100 may be driven by data provided by the processor 45 via the data bus 60.

The apparatus 10 also preferably includes a compressor/decompressor 105 which is operative to compress/decompress data provided to/retrieved from any one of the memories 55 and 65. The compressor/decompressor 105 is preferably operatively associated with the data bus 60.

Preferably, the apparatus 10 may be operated by the user via a remote control 110 which communicates with the apparatus 10 via an input/output (I/O) interface 115. The I/O interface 115 is preferably comprised in the apparatus 10 and is operatively associated with the processor 45. It is appreciated that instructions and selections inputted by the user via the remote control 110 are executed by the processor 45. Preferably, the remote control 110 includes function keys 120, 121, 122, 123, 124, 125 and 126 for operating special functions as described below.

The apparatus 10 also preferably includes an encryptor/decrypter 130 which is operative to encrypt/decrypt data provided to/retrieved from any one of the memories 55 and 65. The encryptor/decrypter 130 is preferably operatively associated with the data bus 60 and is operative with keys or seeds provided by a smart card 135 via a smart card reader 140. It is appreciated that the keys or seeds provided by the smart card 135 may be operative to provide conditional access to and parental control of data stored in the memories 55 and 65.

The processor 45 preferably includes the following units: an agent module 145; a commercial manager 150; a user programming manager 155; an image processor 160; and a viewing analysis module 165.

The operation of the apparatus 10 of Fig. 1 is now briefly described. Preferably, the apparatus 10 may be employed to digitally record television programs provided by the headend 15 in one of the memories 55 and 65. If the IRD 40 includes a plurality of tuners (not shown), the apparatus 10 may be operative to record several programs simultaneously, wherein the programs may be transmitted over different channels.

Preferably, the apparatus 10 may be also employed to record programs provided by the video source 75, and programs and data provided via the LAN 85 and the telephone network 80. It is appreciated that the apparatus 10 may

(Abe's idea broadcast stuff v. fast / slow to be replayed later at normal speed)
can you watch + record at diff. channels

the same time? - Is that clear in the text?

operate as a home server for recording and displaying programs and information generated at various terminals at home and/or provided from networks, such as the Internet.

It is appreciated that recording of programs and data and retrieval of programs and data stored in the memories 55 and 65 is preferably controlled by the processor 45. The apparatus 10 also preferably enables a variety of additional features such as editing of programs stored in the memories 55 and 65 to include only portions which are of interest to the user.

by the
user
+
by the
user

Another feature includes freeze of a broadcast television program. In such a case, when the user freezes the program, such as by operating the key 121 on the remote control 110, the program is recorded, for example in the memory 55. When the user unfreezes the program, the apparatus 10 may resume playing the program from the memory 55 rather than from current broadcast of the program. Preferably, the apparatus 10 uses the memory 55 as a circular buffer and resumes playing the program from the point at which the program was frozen. It is appreciated that from that point on, the program is played from the memory 55 in a delayed mode of operation. Thus, the user may stop watching the television program, for example in order to answer to a telephone call, and may resume watching the television program without missing any portion of the program. It is appreciated that the program may also include marks which enable the user to skip some portions of the program to catch-up with the broadcast.

five we
offer a
way to
replay
goals?

maybe the
last 5
mins to allow
'cached'
so that the
viewer can
replay it.

An additional feature preferably includes display of multiple programs simultaneously on a screen of the television 50. This feature, referred to as picture-in-picture (PIP), may be employed by the user if he does not want to miss programs but has limited time to watch television. Preferably, while watching two programs in a PIP mode, the user may switch between the two programs if he decides to watch only one of the programs on the full television screen. A determination of the program currently watched is preferably provided by the audio currently played.

Alternatively or additionally, in the PIP mode the user may view a premium program on a portion of the television screen without the accompanying

audio and another program on the rest of the television screen with accompanying audio. In order to see the premium program on the full screen together with the audio, the user may be required to pay for the premium program. Preferably, payment for the program is performed in a conventional method, such as by operating the key 123 on the remote control 110 to accept the program. The payment is preferably handled via the smart card 135.

It is appreciated that at least part of the material received at the apparatus 10 may be compressed and encrypted. In such a case, the material is preferably decompressed at the compressor/decompressor 105 and decrypted at the encryptor/decrypter 130 under control of the smart card 135 as is well known in the art.

Preferably, a program received at the apparatus 10 is associated with a broadcaster set of parameters enabling access to predetermined portions of the program. The broadcaster set of parameters may preferably define the following information and/or tags which characterize the program:

- (1) A type of the program such as a movie, a show, a commercial, and a web originating program;
- (2) supplementary information accompanying the program such as a review of the program as provided by a reviewer, detailed information regarding a product offered by the program, and notes accompanying the program;
- (3) an associated audio channel in a language which differs from the language used in an original audio channel associated with the program;
- (4) program delete enabled/disabled;
- (5) parental control associated with portions of the program which require parental control;
- (6) commended expiration time of the program;
- (7) special features, such as PIP availability;
- (8) general information, such as a program title, a time when the program is broadcast, a length of the program, a determination whether the program is encrypted and a compression format of the program;

(9) quality and characteristics of material transmitted, such as a data rate, cancellation of material already transmitted such as E-mail, and selective routing of part of the material to selected users.

what about tags (and or index of tags for different sections of the program)

It is appreciated that the broadcaster set of parameters mentioned above is not meant to be limiting, and it may include additional parameters.

It is further appreciated that not all of the above mentioned parameters must be associated with each program. For example, programs may be transmitted without supplementary information or additional audio channels in various languages.

The parameter of delete enabled/disabled is preferably used mainly in conjunction with commercials as described below. All the other parameters are transmitted as necessary.

It is appreciated that the parameter defining the quality and characteristics of material transmitted may be used, for example, when an available bandwidth for transmission is limited. In such a case, the broadcaster may select a quality parameter to speed up transmission of selected information and programs and to slow down transmission of other information and programs.

Preferably, at the apparatus 10, an agent resident in the agent module 145 is operated on the program to determine whether to record the program, for example in the memory 55, and to associate with the program an agent set of parameters enabling access to predetermined portions of the program. Preferably, if the agent determines that the program must be recorded, the agent may record the program with the agent set of parameters which may be different from the broadcaster set of parameters. It is appreciated that the agent may preferably include an intelligent agent which determines preferences of the user and adjusts the preferences in accordance with viewing habits of the user. It is further appreciated that the agent may be programmable, and the user may determine preferences by entering information which may be used as inputs for the agent.

Preferably, the agent set of parameters may override at least a portion of the broadcaster set of parameters. For example, if a program is broadcast with

two audio channels accompanying the video, the agent may determine that only one of the audio channels must be recorded with the video. Additionally, the agent may record only a portion of the supplementary information accompanying the program. The agent may also determine additional portions of the program which may require parental control and may override options such as "delete enabled" and expiration time if the program is considered a favorite program.

It is appreciated that the agent may be also operative to determine attributes that are not provided by the broadcaster set of parameters. Thus, the agent set of parameters may preferably additionally define some or all of the following information and/or tags which may characterize the program prior to recording and during recording:

- (1) a quality of recording of the program;
- (2) a type of program whose recording is required;
- (3) titles of favorite programs whose recording is required;
- (4) a time and a date when recording of programs is required; and
- (5) existence of a review attached to the program.

It is appreciated that the above mentioned agent set of parameters may is not meant to be limiting and it may include additional parameters.

Preferably, the quality of recording of the program is determined by the agent prior to recording of the program, and preferably in accordance with the amount of free storage capacity in the memories 55 and 65. Alternatively, the user may select the quality of recording by pressing the key 126 on the remote control 110. It is appreciated that the parameter defining the quality of recording may also preferably include a routing parameter which routes the program to a selected one of the memories 55 and 65.

The parameters indicating the type of program to be recorded, titles of favorite programs whose recording is required and the time and the date when recording of programs is required may be either programmed by the user or

Preferably, the broadcaster set of parameters may include a subset of parameters which cannot be overridden by any of the agent set of parameters and the user set of parameters. It is appreciated that parameters in the subset of parameters which cannot be overridden may include, for example, the type of the program, a basic parental control rating and a "delete disabled" option in case the program is a commercial. It is further appreciated that the broadcaster may determine additional parameters in the subset of parameters which cannot be overridden.

The user set of parameters may preferably include, in addition to at least some of the broadcaster set of parameters and the agent set of parameters, parameters defining some or all of the following information and/or tags which may characterize the program:

- (1) a program rating provided by the user;
- (2) a review of the program - selected from a list of available reviews, or printed by the user;
- (3) a request for additional information relating to the program;
- (4) a format of the program after editing operations such as mixing portions of the program, reordering of portions of the program, and deletion of portions of the program;
- (5) preferred highlights, such as a goal in a football game;
- (6) compression preferences for compressing the program prior to storage;
- (7) image manipulation; and
- (8) video wallpaper selection.

It is appreciated that the above mentioned user set of parameters is not meant to be limiting and it may include additional parameters.

It is further appreciated that the program rating may preferably be programmed by the user by entering a rating parameter from an available list of rating parameters. Alternatively, the user may operate the function key 120 in the remote control 110 to input a rating for the program.

Preferably, a review of the program selected by the user may be associated with the program so that the review entered by the user is recorded as part of the program. Alternatively, the user may retrieve the program with a review selected from a list of available reviews. Typically, after viewing the review the user may decide whether to view the program or not.

The request for additional information relating to the program is preferably transmitted to the headend 15, and the headend 15 may preferably transmit the additional information a short time after the request is received thereat.

Preferably, the format of the program after editing may be used to replace the original format of the program as saved in the memory 55. Thus, after reformatting, the edited addressable program may occupy less memory capacity than the addressable program. It is appreciated that the user may reformat the addressable program so that only the preferred highlights of the program are stored, and the rest of the program is deleted.

The compression preferences may be employed to apply different compression procedures to the program prior to storage. If, for example, the program transmitted is compressed with the conventional MPEG-2 compression procedure, the user may decide to compress the program with an improved compression procedure, such as the MPEG-4.

Preferably, the parameter defining image manipulation may be generated in response to operations performed by the user on video images of the program. For example, the broadcaster may transmit two programs in a PIP mode. In such a case, when the user selects only one of the programs, the image processor 160 is operative to display the program on the whole screen of the television 50.

It is appreciated that image manipulation may also include rotation and translation of images as well as zoom on the images. Preferably, the image manipulation is performed in the image processor 160 using conventional image processing methods.

The parameter defining a video wallpaper selection may be employed to select a video image, or a series of still video images, to accompany audio when an audio channel is selected. For example, the user may select an image of a sunset

from a library of video images to accompany love songs provided via an audio channel.

It is appreciated that user editing operations and inputs may be processed in the user programming manager 155. Preferably, user reactions to the program and the rating of the program is analyzed in the viewing analysis module 165 which preferably executes operations and functions similar to those performed in a conventional Nielsen box.

It is appreciated that at least one of the broadcaster set of parameters, the agent set of parameters, and the user set of parameters may preferably include at least a tag determining a program retrieval parameter, and the program may be retrieved by selecting the tag. Additionally, information resident in the program, such as teletext and video images, may be used to create tags according to which the program may be retrieved and manipulated.

Preferably, the key 124 on the remote control 110 may be employed by the user as a conventional "ENTER" key to execute an operation or a series of operations preceding operation of the "ENTER" key 124. When the key 124 is pressed after a series of editing operations on a program, the series of editing operations are entered and the program is stored in an edited form.

The key 125 on the remote control 110 may preferably be employed by the user as a "NEXT" button to browse through programs stored in any of the memories 55 and 65. If, for example, the user watches a program retrieved from the memory 55 and presses the key 125, the processor 45 preferably accesses a start point of a program which follows the program in the memory 55.

It is appreciated that at least some of the programs may be encrypted. In such a case, the user must insert the smart card 135 in the smart card reader 140 to allow access to the encrypted programs. It is appreciated that conditional access via the smart card 135 to encrypted programs is preferably performed in one of methods which are well known in the art. It is further appreciated that programs which are transmitted in clear form do not require presence of the smart card 135.

If the program is a commercial it is preferably processed in the commercial manager 150. Preferably, the commercial receives additional attributes

which may be used to control distribution and display of the commercial and to provide feedback to advertisers. Additionally, the commercial may receive attributes which prevent skipping the commercial without viewing it. Preferably, the additional attributes are assigned to the commercial by the broadcaster by associating a commercial set of parameters to the commercial in addition to the above mentioned broadcaster set of parameters.

The commercial set of parameters may preferably define the following additional information and/or tags which specifically characterize the commercial:

- (1) a time and date when the commercial is watched;
- (2) expiration after a predetermined number of people have seen the commercial;
- (3) fast-forward disabled;
- (4) additional information regarding a product offered by the commercial; and
- (5) targeting information.

for it
has been seen
a certain
no. of times.

It is appreciated that the above mentioned commercial set of parameters is not meant to be limiting and it may include additional parameters.

Preferably, the time and date when the commercial is watched is associated with a variable payment rate, where the payment rate varies with the time of day when the commercial is viewed. It is appreciated that information regarding the time and date when the commercial is viewed is preferably analyzed in the processor 45 and transmitted to the headend 15 via an uplink provided by the transmitter 100. It is further appreciated that the processor 45 may also delete the commercial after the user has seen it a predetermined number of times.

OK

The parameter defining expiration after a predetermined number of people have seen the commercial may be employed by the broadcaster to know, in real time, the number of people who watch the commercial and to delete the commercial after a predetermined number of people have seen the commercial. The broadcaster may also employ the parameter defining expiration after a predetermined number of people have seen the commercial to provide a proof of

after
contact
with
headend
via
the
back

exposure to the commercial against which the advertisers typically pay the broadcaster.

Preferably, the parameter disabling the option of "fast-forward" when the commercial is displayed may be employed to prevent situations in which the user skips the commercial. When this parameter is employed, the processor 45 prevents browsing, and the user may either view the commercial or pass to another program. ANY OTHER IDEAS ? I DON'T KNOW HOW ELSE WOULD LIKE TO DO THAT !

Commercial
matched
to viewer
-
Must see
a certain
amount per
month

Preferably, the user may respond to the commercial by requesting additional information regarding the product offered by the commercial. The request for additional information may preferably be inputted by operating the function key 122 in the remote control 110.

I don't like
it should
do this !

The targeting information is preferably employed to define fields of potential interest of the user. The commercial is preferably transmitted to the user only if the commercial is in a field of interest of the user. It is appreciated that targeting criteria may be stored in the smart card 135.

transmitted to
all but
recorded only
if it matches
the criteria

Additionally or alternatively, the targeting information may include a request for payment so that if the commercial is provided as a premium advertisement service, the user may be required to pay for watching the commercial.

It is appreciated that the commercial manager 150 may also include a statistics manager (not shown) which may provide statistics information, such the number of times the commercial was viewed by the user, and the commercial manager 150 may display the commercial or delete it based upon the statistics information.

to the
head end
via
cable back
etc.

Reference is now additionally made to Fig. 2 which is a simplified flow chart illustration of a preferred method of operation of the apparatus 10 of Fig. 1.

Preferably, a broadcaster associates a set of broadcaster parameters to a program and broadcasts the program to a plurality of users. It is appreciated that the broadcaster may associate different sets of broadcaster parameters to different

programs, and each program may receive a unique set of broadcaster parameters. Each broadcaster set of parameters preferably enables access to predetermined portions of each of the different programs.

Preferably, the program is received at the apparatus 10 at a user premises. At the apparatus 10, an agent program, generally referred to as an agent, is executed on the program. The agent is preferably personalized according to viewing habits of the user.

Preferably, the agent determines whether to record the program, for example in the memory 55, and associates with the program, upon recording, an agent set of parameters enabling access to predetermined portions of the program. It is appreciated that the program is preferably stored together with the broadcaster set of parameters and the agent set of parameters thereby generating an addressable program.

Preferably, the user may retrieve at least a portion of the addressable program and watch the at least a portion of the addressable program on the television 50. Then, the user may perform editing operations on the addressable program which typically result with an input of a user set of parameters enabling access to predetermined portions of the program. The user set of parameters is preferably received at the processor 45 and when the user presses the "ENTER" key 124 on the remote control the addressable program is edited to generate an edited addressable program including the user set of parameters enabling access to predetermined portions. Preferably, the edited addressable program replaces the addressable program recorded in the memory 55.

Reference is now additionally made to Figs. 3A and 3B which together constitute a simplified flow chart illustration of a preferred method of manipulation of television programs recorded in the apparatus 10 of Fig. 1.

Preferably, a user may select viewing a television program broadcast from the headend 15 or a stored television program stored in the memory 55.

If the user watches a broadcast television program, the user may, at any time during the broadcast, freeze the program by pressing the freeze key 121 in the remote control 110. In such a case, the program, starting from the instant the

details
back in
EPG only
while
broadcast
up to a
week
earlier.

user pressed the freeze key 121, is recorded in the memory 55. When the user presses the freeze key 121 again, the program is retrieved from the memory and the user may watch the program from the moment the program was frozen.

If the user watches the stored television program, the user may edit the program at any time during which the program is played. Preferably, editing of the program may include deletion of parts of the program, combinations of parts of the programs and reordering of the program. Additionally, the user may also combines portions of the program with other programs to create a new program.

Preferably, the user may also perform at least one of the following operations while watching the program by employing the remote control 110 or another appropriate input device:

- (1) input a rating by pressing the rating key 120 on the remote control or by typing a rating;
- (2) input a review to the program or retrieve a review of the program;
- (3) accept a premium program in a PIP mode;
- (4) switch to one of a plurality of programs displayed in a PIP mode;
- (5) browse through recorded programs by pressing the "NEXT" key 125 on the remote control 110;
- (6) select a program from a menu or an electronic program guide;
- (7) select a language for playing the audio, i.e. select one of a plurality of audio channels;
- (8) select a quality of recording by pressing the key 126 on the remote control 110;
- (9) change parental control criteria and define portions of the program as locked under a secret code;
- (10) program the agent and/or specify recording data, i.e. channels from which to record, either simultaneously or separately, dates and times for recording;
- (11) save highlights of the program, for example by pressing the "ENTER" key 124 on the remote control;
- (12) select compression format for storage of the program;

or sections of the program e.g. sections of a news program.

Jump to / sections of a program using select button at predefined specified times.

- (13) program a commended expiration time for deleting programs when the memory 55 or 65 is full;
- (14) manipulate images on the television screen, e.g. zoom on an image;
- (15) select a video wallpaper; and
- (16) tag the program with selected information.

Additionally, if the program is a commercial the user may also perform at least one of the following operations while watching the commercial employing the remote control 110 or another appropriate input device:

- (1) request additional information regarding a product offered by the commercial by pressing the key 122 on the remote control 110; and
- (2) change user profile for targeted advertisement information.

It is appreciated that various features of the invention which are, for clarity, described in the contexts of separate embodiments may also be provided in combination in a single embodiment. Conversely, various features of the invention which are, for brevity, described in the context of a single embodiment may also be provided separately or in any suitable subcombination.

It will be appreciated by persons skilled in the art that the present invention is not limited by what has been particularly shown and described herein above. Rather the scope of the invention is defined only by the claims which follow:

What is claimed is:

CLAIMS

1. A digital television recording method comprising:
broadcasting a television program associated with a broadcaster set of parameters enabling access to a first set of predetermined portions of the program;
executing an agent program for determining whether to record the program and for associating with the program, upon recording of the program, an agent set of parameters enabling access to a second set of predetermined portions of the program;
storing the program together with the broadcaster set of parameters and the agent set of parameters to generate an addressable program;
retrieving at least a portion of the addressable program;
displaying said at least a portion of the addressable program to a user;
receiving from the user a user set of parameters enabling access to a third set of predetermined portions of the addressable program;
editing the addressable program to include said user set of parameters enabling access to the third set of predetermined portions of the addressable program thereby generating an edited addressable program; and
storing the edited addressable program.
2. A method according to claim 1 and wherein said agent set of parameters is operative to override at least a portion of the broadcaster set of parameters.
3. A method according to claim 1 or claim 2 and wherein said user set of parameters is operative to override at least one of a portion of the broadcaster set of parameters, and a portion of the agent set of parameters.

4. A method according to any of claims 1 - 3 and wherein said broadcaster set of parameters comprises a subset of parameters which cannot be overridden by any of the agent set of parameters and the user set of parameters.

5. A method according to any of claims 1 - 4 and wherein at least one of said broadcaster set of parameters, said agent set of parameters, and said user set of parameters comprises a tag determining a program retrieval parameter.

6. A method according to any of claims 1 - 5 and wherein said agent set of parameters comprises a recording quality parameter determining a quality of recording of the program.

7. A method according to any of claims 1 - 5 and wherein said user set of parameters comprises a rating parameter determining a rating of the program as provided by the user.

8. A method according to any of claims 1 - 7 and wherein the television program comprises a commercial and the broadcaster set of parameters comprises a commercial set of parameters.

9. A method according to any of claims 1 - 8 and wherein the television program comprises a commercial and the broadcaster set of parameters comprises a parameter determining a request for additional information related to the commercial.

10. A method according to any of claims 1 - 9 and wherein the television program comprises a commercial and the broadcaster set of parameters comprises a parameter determining expiration of the commercial after a predetermined number of people have seen the commercial.

+ time limit

11. A method according to any of claims 1 - 10 and wherein the television program comprises a commercial and the broadcaster set of parameters comprises a parameter disabling fast-forward browsing through the commercial.

This is missing the point. The commercials are not part of the

12. A method according to any of claims 1 - 7 and wherein the television program comprises two separate television programs displayed simultaneously in a picture-in-picture (PIP) mode on a television screen, and the user set of parameters comprises a parameter determining a viewing selection for viewing only one of the two separate television programs on the full television screen.

recording of the film. They are interspersed in the film from the hard disk. If

13. A method according to any of claims 1 - 12 and wherein the broadcaster set of parameters comprises at least one parameter determining at least one of the following information fields: a type of the program; supplementary information accompanying the program; an associated audio channel in a language which differs from a language used in an original audio channel associated with the program; program delete enabled/disabled; parental control associated with portions of the program which require parental control; commended expiration time of the program; picture-in-picture availability; a program title; a time when the program is broadcast; a length of the program; a determination whether the program is encrypted; a compression format of the program; characteristics of the program; cancellation of material already transmitted in the program; and selective routing of part of the material to selected users.

the user does not watch them now, then he will be to watch them later or pay more now

14. A method according to any of claims 1 - 5 and 7 - 13 and wherein the agent set of parameters comprises at least one parameter determining at least one of the following information fields: a quality of recording of the program; a type of program whose recording is required; at least a title of a favorite program whose recording is required; a time and a date when recording of the program is required; and existence of a review attached to the program.

15. A method according to any of claims 1 - 6 and 8 - 14 and wherein the user set of parameters comprises at least one parameter determining at least one of the following information fields: a program rating provided by the user; a review of the program; a request for additional information relating to the program; a format of the program after editing operations; at least one highlight in the program; compression preferences for compressing the program prior to storage; image manipulation; and video wallpaper selection.

16. A method according to any of claims 1 - 15 and wherein said first set of predetermined portions of the program, said second set of predetermined portions of the program, and said third set of predetermined portions of the addressable program include identical portions of the program.

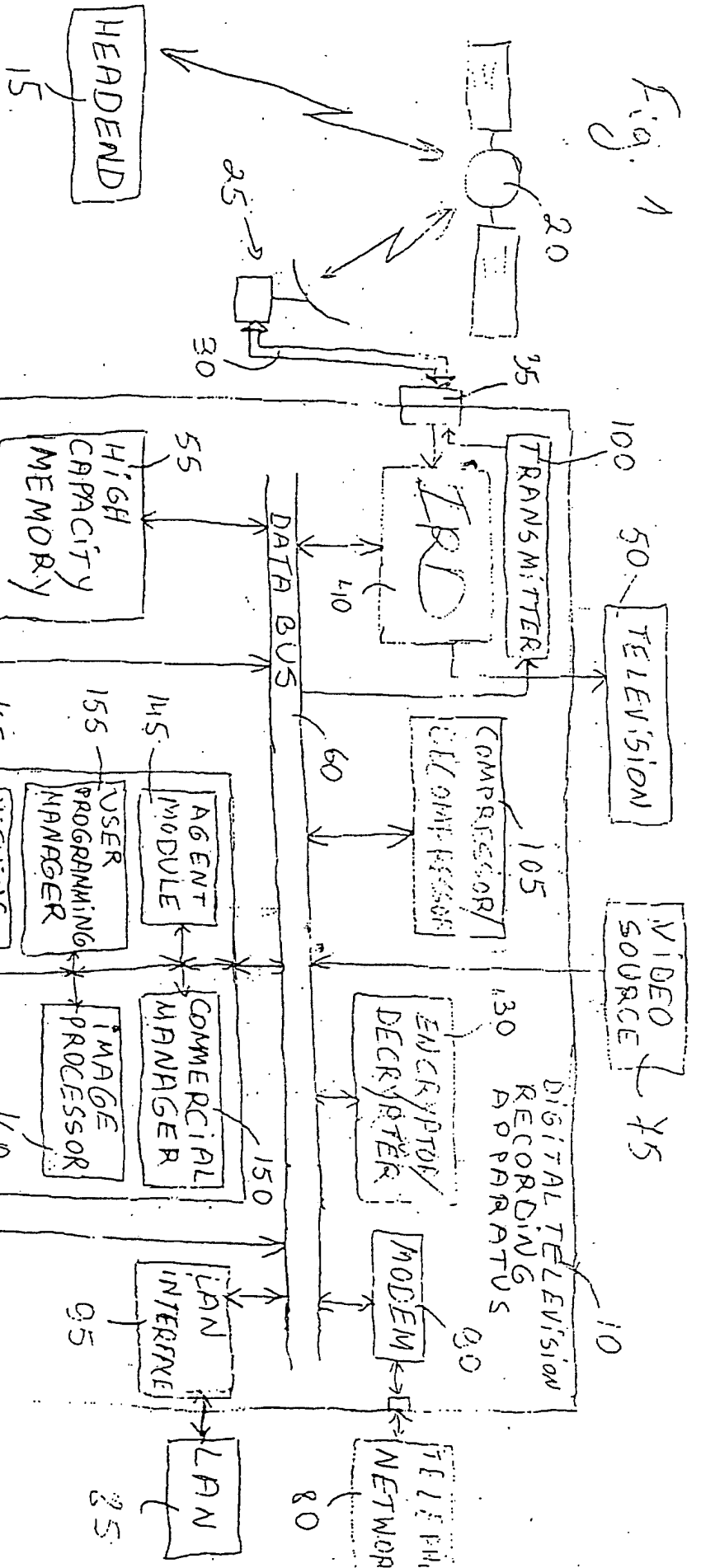
17. Apparatus for digital recording of a television program comprising:
a processor for determining whether to record the television program;
a memory associated with the processor for storing the television program in response to a recording determination received from the processor; and
a recording quality selector associated with the processor and the memory and operative to select a recording quality parameter determining a quality of storage of the television program in the memory.

18. Apparatus according to claim 17 and also comprising a freeze selector operatively associated with the processor, wherein upon a first activation of the freeze selector, the processor is operative to record the program in the memory from a moment of first activation of the freeze selector, and upon a second activation of the freeze selector, the processor is operative to play the program recorded in the memory from the moment of first activation.

19. Apparatus according to claim 17 or claim 18 and also comprising:
a rating activator associated with the processor and the memory and operative to input information determining a rating given to the program.

20. Apparatus according to any of claims 17 - 19 and also comprising:
a NEXT key selector associated with the processor and the memory
and operative to browse through television programs stored in the memory.
21. Apparatus for digital recording of a television program comprising:
a processor for determining whether to record the television program;
a memory associated with the processor for storing the television
program in response to a recording determination received from the processor, and
a rating activator associated with the processor and the memory and
operative to input information determining a rating given to the television program.
22. Apparatus according to claim 21 and also comprising a freeze
selector operatively associated with the processor, wherein upon a first activation of
the freeze selector, the processor is operative to record the program in the memory
from a moment of first activation of the freeze selector, and upon a second
activation of the freeze selector, the processor is operative to play the program
recorded in the memory from the moment of first activation.
23. Apparatus according to claims 21 or 22 and also comprising:
a NEXT key selector associated with the processor and the memory
and operative to browse through television programs stored in the memory.
24. Apparatus for digital recording of a television program comprising:
a processor for determining whether to record the television program;
a memory associated with the processor for storing the television
program in response to a recording determination received from the processor; and
a NEXT key selector associated with the processor and the memory
and operative to browse through television programs stored in the memory.

1



from
Jonathan Marshall

parts for neighborhood
- other devices eg: can ^{video}

FIG. 2

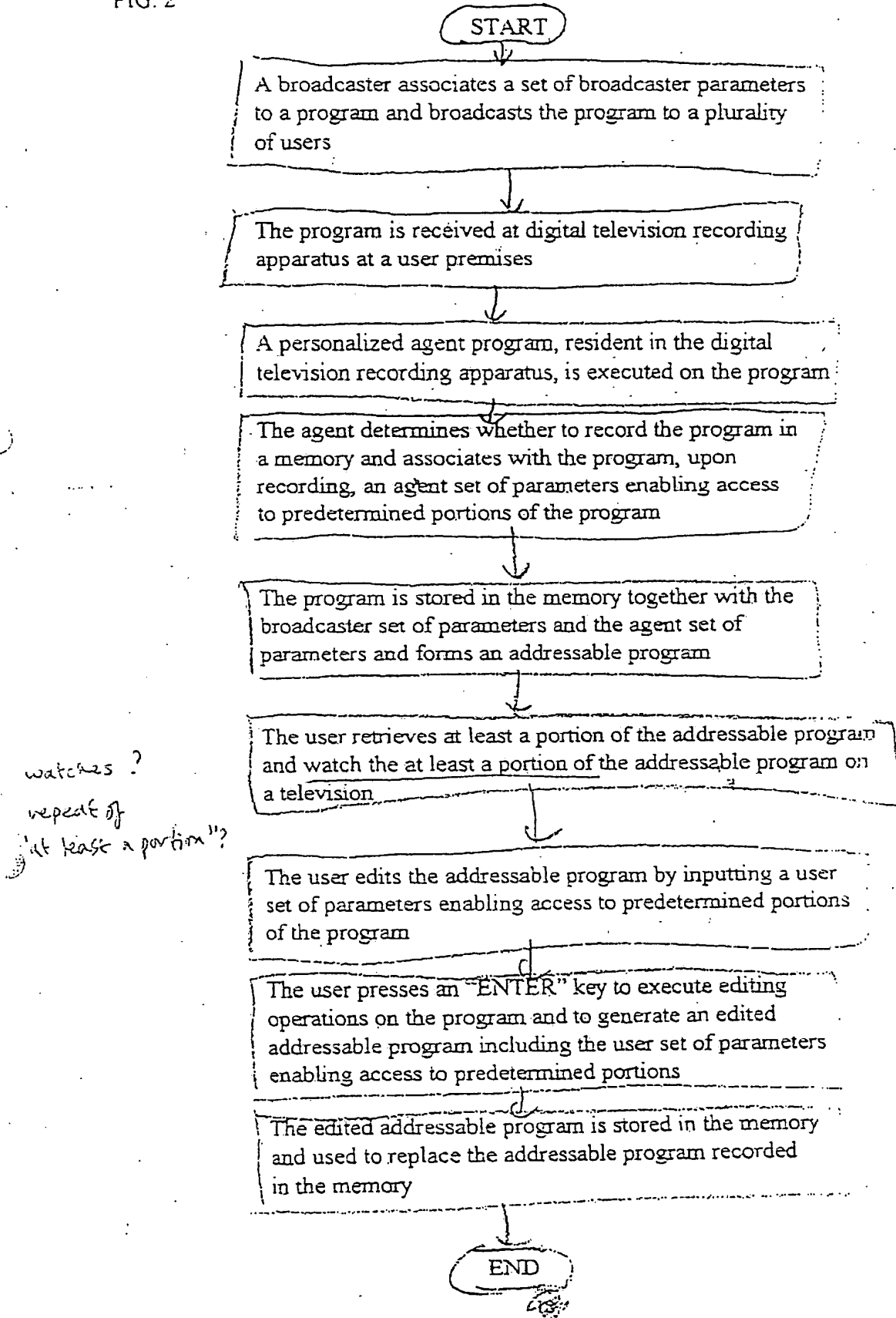


FIG. 3A

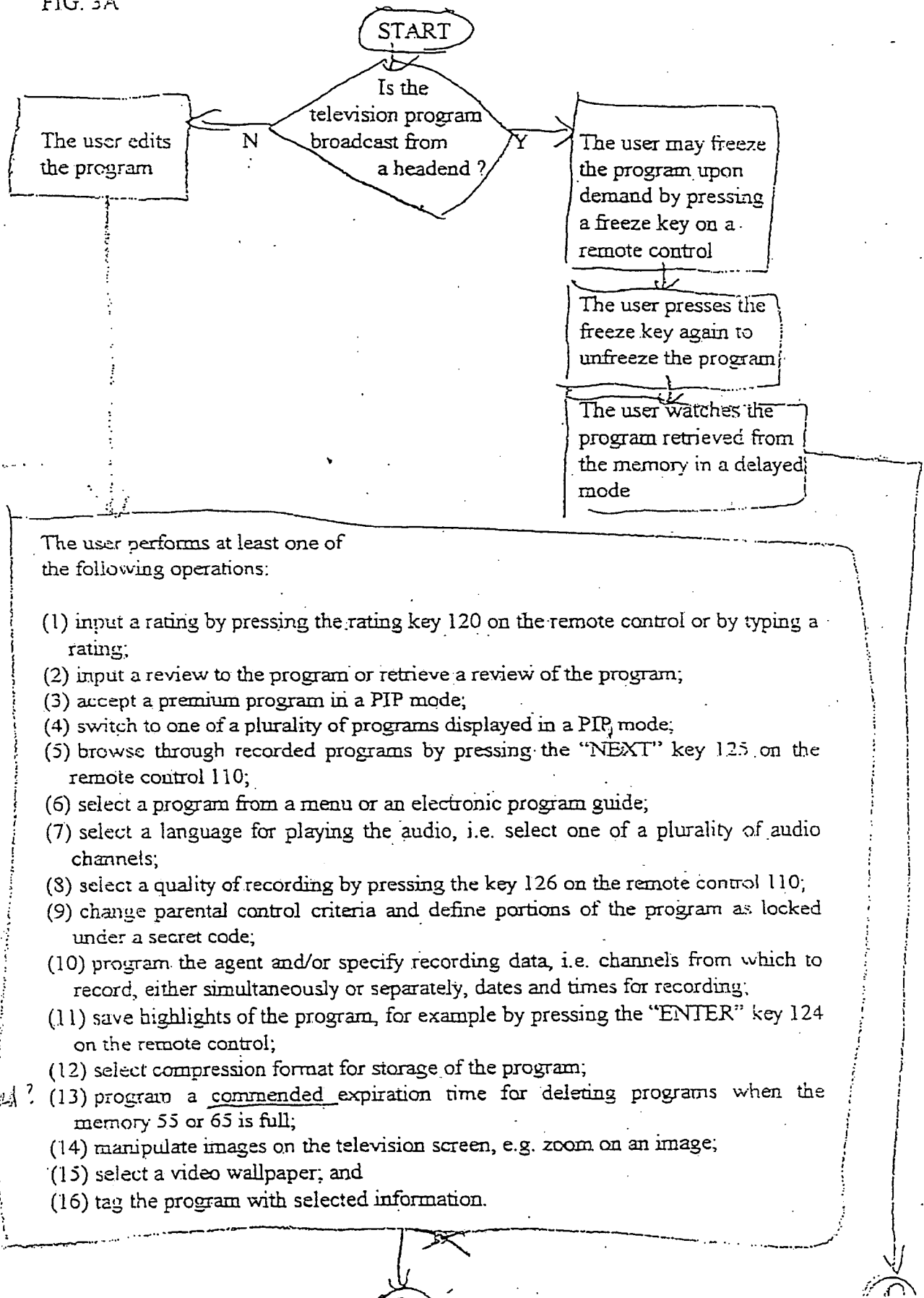
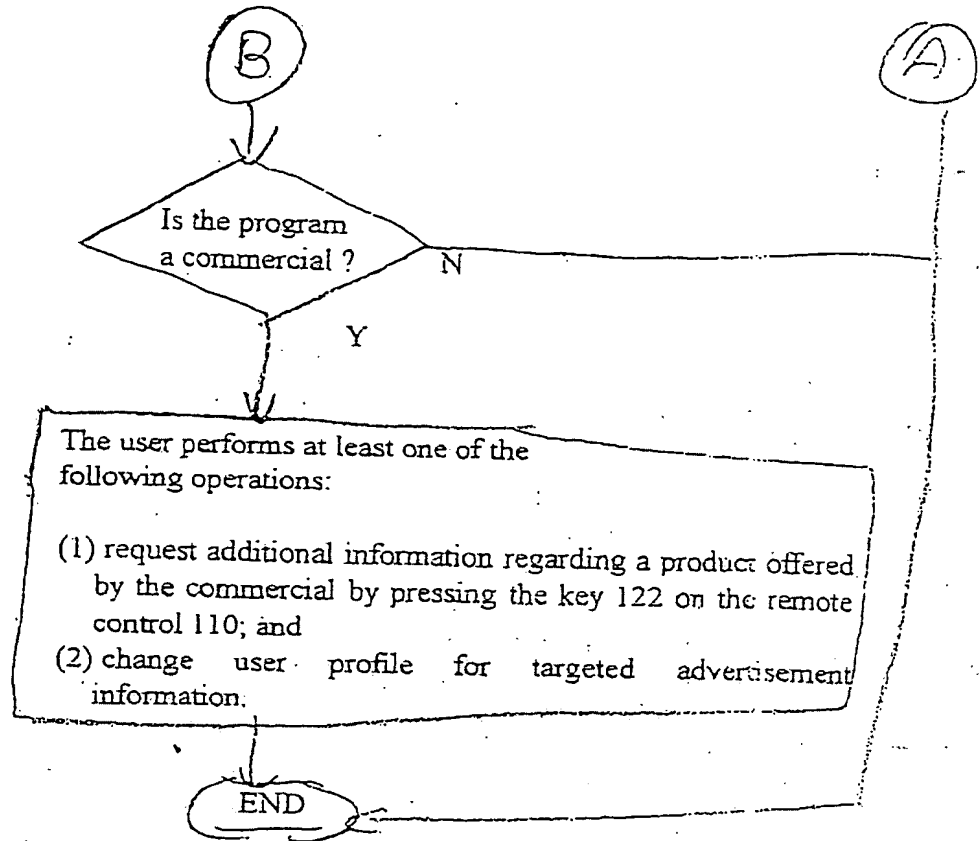


FIG. 3B



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